98-84360-28

Great Britain.

Debate in the House of Commons, on the...

London

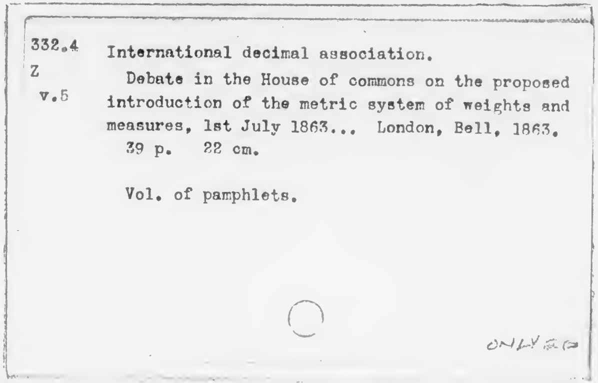
1863

98-84360-28
MASTER NEGATIVE #

COLUMBIA UNIVERSITY LIBRARIES
PRESERVATION DIVISION

BIBLIOGRAPHIC MICROFORM TARGET

ORIGINAL MATERIAL AS FILMED - EXISTING BIBLIOGRAPHIC RECORD



332.4
Z
v.5

International decimal association.
Debate in the House of commons on the proposed introduction of the metric system of weights and measures, 1st July 1863... London, Bell, 1863.
39 p. 22 cm.

Vol. of pamphlets.

ONLY ED

RESTRICTIONS ON USE: *Reproductions may not be made without permission from Columbia University Libraries.*

TECHNICAL MICROFORM DATA

FILM SIZE: 35mm
REDUCTION RATIO: 11:1
IMAGE PLACEMENT: IA [✓ IIA] IB IIB

DATE FILMED: 3-5-98
INITIALS: PB

TRACKING # : 31980

FILMED BY PRESERVATION RESOURCES, BETHLEHEM, PA.

P32
30

332.4
Z
v.5

Debate in the House of Commons

ON THE

PROPOSED INTRODUCTION

OF

THE METRIC SYSTEM

OF

WEIGHTS AND MEASURES,

1st JULY, 1863,

CORRECTED BY THE RESPECTIVE MEMBERS WHO TOOK PART IN THE DISCUSSION,

AND PUBLISHED BY THE

International Decimal Association.

LONDON:
BELL AND DALDY, 186, FLEET-STREET,
1863.

INTERNATIONAL DECIMAL ASSOCIATION.

President.
THE BARON JAMES DE ROTHSCHILD.

Vice Presidents for Great Britain.
HIS GRACE RICHARD WHATELEY, D.D., Archbishop of Dublin.
RIGHT HON. THE EARL OF ROSSE, K.P., F.R.S.
RIGHT HON. THE EARL FORTESCUE.
THE VERY REV. RICHARD DAWES, M.A., Dean of Hereford.
RICHARD COBDEN, Esq., M.P.
JAMES YATES, Esq., M.A., F.R.S.

Council for 1863.
BROWN SAMUEL, Esq., F.S.S., 11, Lombard street, E.C.
BUCHANAN, G., Esq., M.D., 75, Gower street, Bedford-square.
CHESTER, HARRY, Esq., Rutland-gate.
D'EYNCOURT, L. T., Esq., Hadley-house, near Barnet.
EWART, WILLIAM, Esq., M.P., 6, Cambridge-square.
FARR, WILLIAM, Esq., M.D., F.R.S., General Registrar's Office, Somerset-house.
HAMILTON, G. A., Esq., Treasury, Whitehall.
HENNESSY, JOHN POPE, Esq., M.P., 2, Harcourt-buildings, Temple.
HEYWOOD, JAMES, Esq., F.R.S., Kensington Palace-gardens.
HILL, EDWIN, Esq., Inland Revenue Office, Somerset-house.
HODGKIN, THOMAS, ESQ., M.D., 35, Bedford-square.
HOFMANN, PROF , F.R.S., Royal College of Chemistry, Oxford-street.
JELLICOE, CHARLES, Esq., 3, Crescent, New Bridge-street.
JONES, T. W., Esq., M.D., 19, Finsbury Pavement, Finsbury-square.
LORSONT, J. P., Esq., 56, Cannon-street West.
MESCHIN, THOMAS DE, Esq., LL.D., 44, Chancery-lane.
MOCATTA, DAVID, Esq., 29, Gloucester-square.
PAGLIARDINI, TITO, Esq., 75, Upper Berkeley-street, Portman-square.
SMITH, J. B., Esq., M.P., 105, Westbourne-terrace.
SQUIRE, PETER, Esq., 277, Oxford-street.
WINKWORTH, THOS., Esq., Gresham Club, Old Broad-street.
YATES, JAMES, Esq., F.R.S., Lauderdale-house, Highgate.

Honorary Secretaries.
R. G. WILLIAMS, Esq., M.A., 3, King's Bench-walk, Temple.
JOHN MIDDLETON HARE, Jun., Esq., B.A., War Office, Pall-mall.

Resident Secretary.
LEONE LEVI, Esq., LL.D., F.S.S.

Auditors.
R. G. WILLIAMS, Esq., M.A.
E. BELLROCHE, Esq.

Contributions to the object of the Association, and all communications respecting it, will be received by Professor Levi, 10, *Farrar's-buildings, Temple, E.C.*

LIBRARY OF
THE REFORM CLUB
Sound Currency Committee,
New York City.

INTRODUCTION.

It is gratifying to the Council of the International Association to state that the House of Commons has affirmed the principle of introducing into the United Kingdom the Metric System of Weights and Measures. Mr. William Ewart's Bill, which was read a second time by a majority of 110 to 75, provided for the establishment by law of four new units, of length, of surface and land measure, of capacity, and of weight, identical with those of the Metric system, with the same nomenclature as that in existence in this country, with the addition of the word "new," corresponding with the Metric nomenclature of "Metre," "Are," "Litre," and "Kilogram;" the new system to be permissive for three years from the passing of the Act, and obligatory after that time.

Nothing is easier than to form a correct view of the whole Metric system. The unit of length, which is also the basis of all the weights and measures, is the metre, which is about three inches longer than the yard. Advancing decimally, we have in a thousand of such yards the unit of road-measure, which is the Kilometre, or mile; and, descending decimally, we hav in the tenth of the metre, the Hand, and in the thousandth part of the metre the smallest unit required for machine work. The square metre is the unit of superficial measure, called the Are, and a hundred such is the Hectar, or new acre. This new acre will be larger, certainly, than the present one. Instead of 4,840 square yards, it will be 11,960 square yards; but the Cheshire acre now in use is 10,240 square yards. The gram is the unit of weight, and a thousand grams make the kilogram, the half of which is very similar to our present pound, whilst a thousand kilograms is nearly the same as our ton.

In the debate it was objected that, instead of taking the French metre as the unit of measure, the Bill gave the number of inches contained in the metre. It would, perhaps, be better to take as a unit the "Standard Metre" in the hands of the Royal Society. But it is important, for the purpose of comparison, to give the exact equivalent of the metre in standard inches, especially as this has been already ascertained. A reference to the report of the Commissioners on Weights and Measures, in 1820, will show that the length of the pendulum vibrating seconds in a vacuum on the level of the sea, in London, by which the standard yard was intended to be computed, in case of loss, has been found to be 39·13929 inches, and that of the French metre 39·37079 inches, the English standards being employed at 62° Fahrenheit. In the same manner the kilogram, a standard of which is kept at the Royal Observatory, has been ascertained by the most careful calculation to be equivalent to 15,432·34874 grains, of which our lb. contains 7,000.

The question of nomenclature is quite a subordinate one, and it is quite open for us either to adopt that in use in France and other countries, or to do the same as has been done in Holland, where they adopted the old Dutch nomenclature for the new quantities.

Much has been said upon the expediency of making the measure permissive only, and not compulsory. The Bill was permissive for three years, a certain time being absolutely necessary for preparation. The question simply is, whether or not we shall fix a time beforehand when the new system of weights and measures shall be made compulsory. No one will advocate the permanent introduction of another system side by side with the existing one; that would add to the present confusion. The great advantage of fixing a time when the new weights and measures shall be compulsory is that the nation will be thereby forced to adapt itself to the use of the new system, and teachers of schools will find it necessary to give themselves in earnest to teach the system in all the schools of the United Kingdom.

The sense of the House, however, being adverse to any compulsory measure in the first instance, and the Committee of the House of Commons having left the matter open, the Council are prepared to support a Bill to that effect, and rejoice to find that Notice of a permissive Bill for next session of Parliament has been given by Mr. Ewart.

The recommendations of the Committee of the House of Commons on the subject were as follows :—

1. That the use of the Metric system be rendered legal, though no compulsory measures should be resorted to until they are sanctioned by the general conviction of the public.

2. That a Department of Weights and Measures be established in connection with the Board of Trade. It would thus become subordinate to the Government, and responsible to Parliament. To it should be intrusted the conservation and verification of the standard, the superintendence of inspectors, and the general duties incident to such a department. It should also take such measures as may from time to time promote the use and extend the knowledge of the Metric system in the departments of Government, and among the people.

3. The Government should sanction the use of the Metric system, together with our present one, in the levying of the customs duties; thus familiarising it among our merchants and manufacturers, and giving facilities to foreign traders in their dealings with this country. Its use, combined with that of our own system, in Government contracts has also been suggested.

4. The Metric system should form one of the subjects of examination in the competitive examinations of the civil service.

5. The gram should be used as a weight for foreign letters and books at the Post-office.

6. The Committee of Council on Education should require the Metric system to be taught (as might easily be done, by means of tables and diagrams) in all schools receiving grants of public money.

7. In the public statistics of the country, quantities should be expressed in terms of the Metric system in juxtaposition with those of our own, as suggested by the International Statistical Congress.

8. In private Bills before Parliament, the use of the Metric system should be allowed.

9. The only weights and measures in use should be the Metric and Imperial, until the Metric has generally been adopted.

10. The proviso in the 5th and 6th William IV. c. 63, s. 6, should be repealed.

11. The department which it is proposed to appoint should make an Annual Report to Parliament.

The expediency of introducing the Metric system has thus been admitted, first, by the unanimous opinion of the Select Committee of the House of Commons, and, secondly, by a large majority of the House itself.

We shall now conclude our observations with a brief summary of the principal reasons in favour of the measure :—

1st. The uniformity in Weights and Measures which it has always been the great object of the Legislature to establish, is defeated by the vast variety of Weights and Measures in use in every part of the country and in many branches of trade.

2nd. The existence of so many Weights and Measures other than the Imperial, proves that we do not at present possess a system adequate to the requirements of trade, and adapted to daily intercourse, and to the purposes of science.

3rd. The Metric Weights and Measures are universally admitted to fulfil the conditions of a sound and convenient system.

4th. This system has been adopted not only in France, but in Belgium, Holland, Spain, Italy, Portugal, Germany, Switzerland, and Greece, and is rapidly extending over other parts of Europe and in America.

5th. The increase of our trade with those countries which use the Metric Weights and Measures renders its adoption by ourselves a matter of great practical importance.

6th. The permissive use of Metric Weights and Measures is highly expedient for the purpose of legalising the transactions now carried on according to that system.

7th. The country has already expressed itself in favour of the Decimal method of calculation, on which the Metric System is based.

8th. The Metric Weights and Measures admit of binary divisions.

9th. By decimalizing the Weights and Measures we best pave the way for the decimalization of our coinage.

10th. Extensive inquiries have been proved that the introduction of the proposed system would secure an immense saving of time in education.

11th. The adoption of the Metric System has been decidedly and unanimously recommended by a Committee of the House of Commons, after most careful inquiry and discussion.

Up to the 10th July, nineteen Petitions were presented to the House of Commons, among which were the following:—

Members of the Chamber of Commerce of Huddersfield, in the county of York, Thos. P. Crosland, Vice-President.
Members of the Council of the Chamber of Commerce for Birmingham and the Midland District. Signed by the direction and on behalf of the Council, George Dixon, Vice-President.
Members of the Leeds Chamber of Commerce, through its President, Darnton Lupton.
Members of the Bradford Chamber of Commerce, Henry W. Ripley, President; John Darlington, Secretary; 29th June, 1863.
Members of the Hertford Literary and Scientific Institution.
Halifax Chamber of Commerce, through its President, Edward Akroyd.
Hull Chamber of Commerce and Shipping, John Lumsden, President of Chamber.
Wolverhampton Chamber of Commerce. Signed on behalf of the Chamber, Edward Perry, President.
Liverpool Chamber of Commerce. Signed on behalf of the Liverpool Chamber of Commerce, R. A. Macfie, President.
Sheffield Chamber of Commerce and Manufactures. Robert Jackson, President.
Pharmaceutical Chemists of Newcastle-upon-Tyne and Gateshead.
Physicians, Surgeons, and Chemists in the Borough of Wakefield, in the county of York.
Inhabitants of Highgate, in the county of Middlesex.
Association of Chambers of Commerce of the United Kingdom, of which are members—the Chambers of Commerce of Belfast, Birmingham, Bradford, Bristol, Coventry, Dewsbury, Gloucester, Goole, Halifax, Huddersfield, Hull, Kendall, Leeds, Newcastle-on-Tyne, Nottingham, Sheffield, Staffordshire Potteries, and Wolverhampton. Signed on behalf of the Association, Sampson S. Lloyd, Chairman.
Members of the Chamber of Commerce of the town of Batley, in the West Riding of the county of York. Signed on behalf of the Batley Chamber of Commerce, John Jubbs, President.

A petition was also entrusted to Mr. Ewart for presentation, from the merchants and traders of the city of London, numerously signed, and comprising the signatures of some of the largest merchants in the City.

The following is the text of some of the petitions:—

The Petition of the Association of Chambers of Commerce of the United Kingdom, of which are Members the Chambers of Commerce of Belfast, Birmingham, Bradford, Bristol, Coventry, Dewsbury, Gloucester, Goole, Halifax, Huddersfield, Hull, Kendal, Leeds, Newcastle-on-Tyne, Nottingham, Sheffield, Staffordshire Potteries, and Wolverhampton,

Humbly sheweth,

That the numerous evils and inconveniences to which the trade of this country is exposed from the almost endless differences existing in the weights and measures used in the United Kingdom, have long been matter of regret to the commercial and trading classes of this country.

That these evils would be effectually remedied if the weights and measures of the United Kingdom were decimalised, and made to correspond with those of other countries.

That the great and rapid increase of the trade of this country with those of foreign countries in which the metric and decimal system is adopted, renders this a question of increasing practical importance.

That at the annual meeting of the Association of Chambers of Commerce of the United Kingdom, held at the Westminster Palace Hotel on the 24th of February in the present year, it was unanimously resolved to Petition both Houses of Parliament in favour of such a measure.

That a Bill for this purpose is now before your honourable House, entitled "A Bill for Decimalising our existing system of Weights and Measures, and for establishing an accordance between them and those of Foreign Countries," which, if carried into a law, will effect this most desirable object.

Your Petitioners therefore humbly pray that your honourable House will pass the above-named Bill.

And your Petitioners will ever pray, &c.

Signed on behalf of the Association,
SAMPSON S. LLOYD, Chairman.

The Petition of the Liverpool Chamber of Commerce,

Humbly sheweth,

That a Bill is now before your honourable House for the introduction of a metrical decimal system of weights and measures in lieu of several cumbrous and confused methods formed by no rule and adhering to no standard (save local custom) now existing throughout the United Kingdom.

That your Petitioners believe that such a system as that advocated would be a boon to the educator, the merchant, the dealer, and the working man. That it would simplify all commercial calculations, bringing them within the capacity of the humblest trader. That its assimilation to the system of so many other countries would facilitate and enlarge the operations of commerce, promote peace, and must therefore be considered as needful to secure and complete international free trade.

Your Petitioners therefore pray for the adoption of the Bill now before your honourable House for the decimalisation of weights and measures and their assimilation to those of foreign nations as far as practical.

And your Petitioners will ever pray, &c.

Signed on behalf of the Liverpool Chamber of Commerce,
R. A. MACFIE, President.

The Humble Petition of the Sheffield Chamber of Commerce and Manufactures,

Sheweth,

That your Petitioners have had under their consideration the provisions of a Bill introduced by Mr. Ewart and other Members into your honourable House, entitled "A Bill for Decimalising our existing system of Weights and Measures, and for establishing an Accordance between them and those of Foreign Countries."

That the said Bill has been so introduced in compliance with a request made to Mr. Ewart by the Associated Chamber of Commerce of the United Kingdom. That in consequence of recent alterations in foreign tariffs an active trade between this country and continental houses is rapidly springing up; and your Petitioners are constantly made to feel the inconvenience arising from the difference which exists between the British system of weights and measures and that of foreign countries.

Your Petitioners therefore pray that your honourable House will endeavour to pass such a measure as will speedily establish an accordance between the system of weights and measures of this country and that of foreign countries.

And your Petitioners will ever pray, &c.

ROBERT JACKSON, President.

The humble Petition of the Council of the Chamber of Commerce for Birmingham and the Midland District,

Sheweth,

That your Petitioners, as merchants or manufacturers, are extensively engaged in commercial transactions in both the home and foreign trade of this country.

That great irregularities at present exist in the ordinary transactions of trade, in consequence of the variety of measures and weights now established by law or custom in this country, which are so ill adjusted to each other as to occasion loss of time, liability to error, and other serious inconvenience in conducting mercantile operations.

That it is of the utmost importance that measures and weights, which have reference to innumerable transactions in daily life, should be established upon a clear and intelligible basis, and should be easy to be comprehended and remembered, capable of simple and uniform sub-divisions, and generally adapted to the wants and understanding of all classes.

That the metric decimal system which is gradually extending itself throughout the Continents of Europe and America, is eminently distinguished by these advantages, and if it were adopted in this country for commercial as well as scientific purposes, would confer great benefits on all classes.

That the increased intercourse between this country and the Continent of Europe arising from the treaty of commerce with France, from the reduction of rates of postage, the abolition of passports, the progressive adoption of more liberal tariffs by other European States, and generally the increased facilities for travelling and international communication, renders it of the highest importance that the measures and weights in use in the United Kingdom and on the Continent of Europe should be assimilated as much as possible.

That, in the opinion of your Petitioners, the present is a favourable time for introducing this change, to be inforced after a sufficient interval of preparation, and they therefore pray that the Bill now before your honourable House for the establishment of a metric decimal system may with such changes of details as may be deemed expedient pass into a law.

And your Petitioners will ever pray.

Signed by the direction and on behalf of the council,
GEORGE DIXON, Vice-President,

DEBATE

ON

METRIC WEIGHTS AND MEASURES.

Mr. WILLIAM EWART moved the second reading of the Weights and Measures (Metric System) Bill. He said—A Committee (of which he had the honour to be chairman) had been directed last session to "inquire into the practicability of adopting a simple and uniform system of Weights and Measures." Two main considerations guided their inquiries—the benefit of our home trade, and the benefit of our trade with foreign countries. The occasion of the International Exhibition was thought a favourable opportunity for ascertaining the improvements which had been effected, and the opinions which prevailed, among continental nations. About twelve eminent foreign witnesses were examined, at the head of whom might be named M. Michel Chevalier. They were unanimously favourable to the metric system. The committee also, whatever might have been their first impressions, unanimously recommended the gradual adoption of that system. What did they find to have been the history of our own system? Before the time of Magna Charta, in the Reign of Richard I. (and even in the Saxon times) it was declared that "there should be one weight and measure throughout the land." From those days down to the last modern act, uniformity was the aim, or the dream, of our legislation. (Hear, hear.) Yet what did we find as the result? We had at present no less than ten different systems of weights. For our ordinary measure we had the inch, foot, and yard. For cloth measure we used yards, nails, and ells. We had about seven sorts of acres. We had an Irish mile, a Scotch mile, and an English mile. There were 20 different bushels, 10 different stones, three sorts of hundredweights, several kinds of tons, and many sorts of gallons. He believed we might lose ourselves in these mazes of numerical confusion. It might literally be said of our system, as was said by Horace of a more poetical one, "*numerisque fertur Lege solutis.*" Every one, he thought, would agree, that certainty is the soul of commerce, yet our transactions between man and man are full of uncertainty. (Hear, hear.) Meanwhile the number and extent of those transactions were constantly increasing. They became more and more accelerated and multiplied as the post, as railways, as the electric telegraph, gave wings to the internal commerce of the country. Therefore, as exchanges between man and man increased, the impediments to those exchanges were felt to be more and more oppressive. (Hear, hear.) On this point the right hon. the member for Oxfordshire gave them the benefit of his evidence. He observed (and his observations were sound and intelligent) that "the great facility of intercourse now taking place has made the necessity or the wish for uniformity in weights and measures stronger than it was ten years ago." "I think," he added, "there is a greater tendency in the public mind to consider the question now. The railways have brought people from east, west, north, and south to every market. It is a great inconvenience to those travelling dealers to go down to markets of which they do not understand the custom. They may have bought and sold, and they really do not know what they have bought and sold." Such were the great and increasing disadvantages of the present system in our home trade. They were also strongly apparent in our foreign commerce and our foreign intercourse. (Hear, hear.) They had made themselves manifest during the Great Exhibition of 1851. In comparing the weights and measure of foreign and British articles, the Jurors of the Exhibition could not understand each other. A similar difficulty occurred at the Great Paris Exhibition of 1855. The International Jury thus expressed their opinion: "They" (the Jury) "deem it their duty earnestly to recommend to the consideration of their respective Governments and the friends of civilisation the adoption of a uniform system of weights and measures computed decimally, both in regard to its multiples and divisors, and also in regard to the elements of all the different units." In 1860, at the London Statistical Congress, the Prince Consort, a name ever memorable, not only in the history of this nation, but in the history of the world, used the following words: "The different weights and measures and currencies, in which different statistics are expressed, cause further difficulties and impediments. Suggestions as to their removal have been made at former meetings, and will, no doubt, be renewed." Can we doubt that an improvement of the present system would have found a supporter in that illustrious Prince

whose philosophic mind
Joy'd in the general good of all mankind?

After 1860 repeated discussions on the subject took place in the Society of Arts; and in 1861 the Associated Chambers of Commerce passed the following Resolution:—"It is highly desirable to adopt the metric system, which has been introduced into other European countries, with great advantage in saving time in trading and other accounts." Now, what was the metric system? It was a decimal system based on the metre as the unit of length, from which the units of weight, capacity, and surface are derived, with multiples, expressed in Greek, and divisors expressed in Latin terms. In fact, it is a framework of decimal calculation, a machine, saving a large amount of labour in the transactions of life. The great men, La Grange, La Place, Condorcet, Monge, and others, who presided at its creation, chose to take the metre from the ten millionth part of a quadrant of the meridian. It was now represented by a fixed

standard, kept in the archives at Paris, of which the nations adopting the metre secure an authentic copy. For a long time a mixed system, the old weights and measures and the new system conflicted with each other in France. The great Napoleon, as he rose in power, favoured the usages of antiquity, and discountenanced the metric system. With the imperial purple he put on the policy of reaction: "*Cum pulchris tunicis sumpsit nova consilia et spes.*" The result was doubt and disorder in commercial dealings. That doubt and disorder continued under the Bourbons. But under Louis Philippe, the monarch of the middle classes, a final law was passed, which insured the introduction of the metric system after an interval of three years, dating from 1837 and ending in 1840. France then passed under the dominion of the metre, and a very competent witness had declared that it was "one of the greatest blessings ever bestowed on France." As to other nations, Holland had long ago adopted the metric system, though retaining her national terms. Belgium had also long since adopted it. So had Spain. Portugal and Spain were now undergoing the process of adoption, ten years being the term allowed. All Italy, following in the footsteps of Sardinia, was rapidly passing within the orbit of the metric system. Switzerland has already done so. In South America it is largely used. Only within the last few weeks its adoption has been approved of in an assembly of the three Scandinavian nations. The following resolution was passed on the 20th May, at the Scandinavian Meeting for Political Economy, consisting of near 500 Swedish, Norwegian, and Danish members of the three parliaments, and others:—"It is expedient to adopt the French metric system, with attendant subdivisions and denominations for weights and measures in the three Scandinavian countries, and to adopt the French franc of five grammes, nine-tenths silver and one-tenth copper, as the unit of Scandinavian coinage, with decimal subdivisions." Since then, the King of Denmark has appointed a commission to study the question, and to draw up a Bill applying the decimal system to the money, weights, and measures of Denmark. Within the last few days our own Post-office, in unison with all those of the Continent, has adopted the metric system for postal objects.* So that we are silently lapsing into the general European system. (Hear, hear.) Ought we then to remain behind other nations—we who have been accustomed to lead them, and of whom Milton has declared it to be the privilege "to teach the nations how to live?" (Hear, hear.) This circumstance is also worthy of consideration—our trade with nations using the metric system is larger than our trade with nations using the English system. To the former our exports in 1861, in round numbers, amounted to £55,000,000; our exports to the latter were only £24,000,000. Our exports to countries using the metric system was greatly increasing. In 1853 they were £32,000,000 in value; in 1861, £55,000,000. It appeared also that, in 1859, 40 per cent. of the tonnage of our shipping were employed in trade with countries which use the metric system. According to the returns just published by the Board of Customs, our exports to France (the primary metric-system country, if he might use such a compound) were, including foreign and colonial goods, in 1860, £12,700,000; in 1861, £21,800,000. But let us look forward to the future. Our trade with France and Italy, Spain and the Mediterranean, and Eastern countries, is probably only in its infancy. "The metric system," says a mercantile witness, "will be adopted in a few years throughout Europe." Will it then be possible for England to remain isolated? (Cheers!) Let us now view the question under another aspect—the saving of labour by means of the metric system in the common operations of commerce. Mr. Lorsont, a Belgian and English merchant, says, in his evidence before the committee, "By using the metric system I could spare two clerks, and prevent a great deal of error." He adds that the maintenance of our system is as bad as if we retained the old Roman figures. Mr. Dickson, a manufacturer and landed proprietor near Dunkirk, also says that, "by using the metric system he could carry on his trade with fewer clerks. He considered the metric system one of the greatest blessings ever conferred on France." Mr. Fellows, a British manufacturer and merchant, says, "The calculations of a French merchant may be made in one-half the time, or less than half the time we employ." The Associated Chambers of Commerce stated, in 1861, that "the present system is very inconvenient to a great commercial nation," and that "the use of the metric system is likely to be a boon to all the community." But there was another important aspect of the question. He meant its reference to machinery and manufactures. We ought, in consequence of our iron, our coal, and our mechanical powers, to be the greatest machine makers in the world. Now Mr. Crossley, an engineer, says in his evidence that "the demand for our machinery would extend much more if an international system of weights and measures were adopted." Mr. Fairbairn, himself celebrated as a mechanist, is of opinion that, "The decimal system will ultimately be introduced into all our mechanical operations. The metric system is, of all he knows, the best." An important point in machine-making is exactness of admeasurement. Can we, under our own system, make machines of such exact dimensions as are made in Belgium, where they make use of the metric system? The importance of minute exactness was shown in the formation of Armstrong guns, where the nice fitting of the concentric circles of iron is of the utmost consequence. For all such operations the use of the millimetre was said by an eminent civil engineer, Mr. Siemens, to be highly advantageous. But, if it be true that we should be the machinists of the world, our workmen must probably travel abroad for employment. How important it is, if not indispensable, that they should previously know the foreign weights and measures, and be instructed in the metric system. (Hear, hear.) But another point remained for consideration. He meant the time which might be saved in education by the adoption of the metric system. Some time ago the International Association for Decimal Weights and Measures caused an inquiry, on this branch of the subject, to be extensively circulated among the schoolmasters of the United Kingdom. The answers they received led to this conclusion, that learning arithmetic by the youth in our schools now ordinarily takes two years, but that under the decimal and metric system it would only take ten months; but let us suppose that the time saved is only a year—is that no great gain to the cause of education? Professor De Morgan stated before the committee that "the time devoted to education in arithmetic might, by the new system, be reduced by one-half, if not by more." Dr. Farr said, "You would get rid of all compound arithmetic, and make calculations simple and mechanical." We should thus liberate ourselves from Reduction, Practice, and other elaborate expedients, to the contentment of our children and the emancipation of their intellect. (Hear, hear.) Dr. Ihne, a German teacher of great experience at Liverpool, stated that the new system gave "a great advantage to boys in foreign schools over our own;" and added that "our boys were deterred by the present system from pursuing the higher mathematics." The Rev. Mr. Barrett, also extensively engaged in teaching, says that, on account of the difference between the two systems, "Education in the French military academies is much higher and more forward than in ours." "Boys," he adds, "are deterred and disgusted" by our present complicated system. May we not, in fact, describe these impediments as so many toll-bars on the highway of education? (Cheers.) But it was shown that, even at a more advanced age, our working men could easily master the metric system. Mr. Dickson, an extensive employer of them abroad, said that "his overseers came from Scotland, knowing nothing of French weights and measures; but they soon acquired the metric system." The Committee examined a working man, Mr. Wyse, who had been twenty years in the employment of Mr. Brassey, the great contractor. Mr. Wyse said that "he very soon understood the metric system, and found it easier to learn than the English scale of yards, feet, and inches." He adds, "All the workmen I ever had to do with prefer the French method to the English." In fact, to pursue our system when we could take advantage of a new one, was like avoiding a railway to go by the old turnpike-road. (Cheers.) In these circumstances, what course shall we adopt? There are, to use the often-quoted phrase of Sir Robert Peel, "three courses open before us." First, shall we retain our present system? The answer, he thought, would be a universal "No." Next, shall we create, or rather patch up, a tesselated system out of the worn-out materials of the present? That course would involve as much trouble as the adoption of the foreign system, and it would have the immense international disadvantage of not agreeing with the system of other nations, a system, with which, after all, we should eventually be obliged to conform. It would be taking two steps, or rather two journeys, when we need only take one. Lastly, shall we gradually adopt the metric system? That system has succeeded wherever it has been tried. All the foreign witnesses, without exception, are in its favour.

---

* Resolved—"Le systême métrique décimal étant de tous les systêmes de poids celui qui satisfait le mieux aux exigences du service des Postes, il y a lieu de l'adopter pour les relations de poste internationale, à l'exclusion de tout autre systême."

It is a perfect decimal system, with ascending decimals to multiply, and descending decimals to divide by. It is no longer a theory. It has become a practical system, involving no preliminary scientific measurement. We have only to copy an existing standard, to pursue the path already trodden by other nations. In short, to use a familiar phrase, it is "ready-made to our hands." He (Mr. Ewart) would therefore say, "Begin." Inquire how Portugal is successfully proceeding; what preliminary steps she took. Inquire of other nations. In the mean time (as the committee advise) give instruction in the metric system in your schools, use it in the Customs department, and, where available, in the other departments of the government. Prepare for the coming change. Defer it, if needful; but prepare. The Bill before the House, for the construction of which we are indebted to the skill and ability of Professor Levi, gives three years' time for preparation. If, at the end of that time, we are not ready, we have only to give three years more, or as much time as might be needed. Next, he came to the objections. It was objected that the Bill should have been only a permissive Bill. He had indeed had a permissive Bill framed, and he was still quite willing to assent to a permissive Bill. That was the suggestion of the committee. But practical men objected to a permissive Bill. They said, "Give us something positive and final; we are tired of alternatives." It was true that in France they went on hovering between two systems for forty years, but those were forty years of confusion, and they were obliged to fix a term at last. But, as he had said before, we are not bound to three years. A continuation Bill is an easy and a common remedy; or, if the House willed it, they could try a permissive system. There was another objection, of which he fully felt the force. It was, the trouble which any change of system would cause to the retail trader. To his case every consideration should be given, and every indulgence shown. He thought that some allowance might be made for the cost which the change in weights and measures would inflict upon the retail dealers. But they also would eventually profit by extended trade and facility of calculation. It was shown, in the evidence of M. Visschers, of Brussels, that the "tradesmen of Belgium were much benefited" by the introduction of the metric system; and Mr. Dickson stated that its advantages, in saving time and trouble, were felt by the "small traders" in France. Another objection raised by the opponents of the metric system was, that it did not admit of the same binary subdivisions as the duodecimal system. That was true. But we give a power of using the binary system to a sufficient extent in our Bill, and our mode of arithmetical notation being (like that of other nations) decimal, what other system can we adopt but the decimal? Repugnance might be felt to the use of the Greek and Latin terms in the metric table. But in our Bill we retain the English units, and it would be easy to substitute English words for the classic terms in the metric scale. The Greek and Latin names are indeed too long. They presuppose some knowledge of the classic languages, and all experience is in favour of monosyllables, which the people seem to have chosen as the most

rapid vehicles for bargain and sale. The pound, the ounce, the yard, the foot, and many more such terms, prove this tendency. (Hear, hear.) Nevertheless it was easy, even for a child, to learn the French metric table, with all its Greek and Latin numerals. Could every, or any, member present correctly repeat the English table of weights and measures? (Laughter and cheers.) Yet all of them, he thought, could learn the French metric table in a quarter of an hour. In fact, they had only to learn seven prefixes and four principal units. On the whole, he was justified in concluding that the disadvantages ascribed to the metric system were slight and transitory; the advantages substantial and lasting. But, it may be said, the adoption of the metric system of weights and measures would be incomplete without a decimal system of coinage. That he granted; but, when a decimal system of coinage was under consideration, a great authority, Lord Overstone, said, that "it would be a mistake to decide in favour of a decimal coinage without determining the best course as to other parts of the metric system. If the number *ten* should be selected as the base of the general metric system, the question of the coinage would be greatly simplified." And in other parts of his Report, Lord Overstone seemed to think that the consideration of a decimal system of weights and measures ought to precede the consideration of a decimal coinage. In his (Mr. Ewart's) opinion they ought to be as nearly as possible simultaneous, but the introduction of the metric system of weights and measures would, in itself, be a great acquisition. (Hear, hear.) Reverting to the former part of his speech, he thought he had established the following propositions—that the present state of our weights and measures is intolerable; that it is growing worse as our internal trade increases; that it impedes our trade with foreign nations, and will impede it more as that trade increases; that other countries have adopted, and are rapidly adopting, the metric system; that it is acknowledged to be a great boon by all the countries in which it has been established; that our trade with the nations using it is rapidly extending; that it would save time in commercial operations; that it would confer great advantages on our machine makers and manufacturers; that it would save a large amount of time in education; lastly, that if we failed to adopt it we should be behind almost all the nations of Europe. At all events (said the hon. gentleman) let us not remain in the "slough of despond," or the "Serbonian bog" in which we are now engulphed. We have achieved the great victory of free-trade; let us adopt the machinery by which free-trade may be set in motion among the nations of the earth. Let us remember that different provinces of the same country were once distracted and divided by discordant systems of weights and measures, as different nations are now. Why should not one uniform system bind countries, as it has bound provinces, together? We have, by solemn treaty, interwoven our interests with those of France and of other nations. Let us, by adopting a common system of weights and measures, give to our commercial intercourse a common language. Let us, in the words of one of our greatest moral and religious poets, not only

> "Give to the North the products of the sun,"

but also

> "Knit the united nations into one."

So shall we best pursue and accomplish the great mission prescribed to all nations, but pre-eminently to our own—to promote the peace, by extending the commerce, of the world. (Cheers.)

Mr. HENLEY said he had certainly expressed an opinion that the metrical system was a good one, but that had nothing to do with the question whether it was desirable to agree to the Bill which made so great a change as that now proposed. No one was more sensible of the inconvenience and uncertainty of the present system of weights and measures than himself. The imperial bushel was as definite a measure as could be set up, and 20 or 30 years ago the Legislature attempted to make that the uniform bushel. The imperial bushel was declared to consist of a certain number of cubic inches. All bargains made in any other bushels were declared void, and penalties were enforced against those who used any other. What had been the result? The bushel still meant one thing in one town and another elsewhere; nay, people who went to the same market could not always agree as to what kind of bushel was meant. He did not believe that a more stringent law could be passed to enforce the use of the new metrical system, and what greater security could the hon. gentleman have that his new weights and measures would be adopted? He agreed with the hon. gentleman that it would not be desirable to adopt such words as myriametres, decametres, and centimetres. He did not think they would ever go down with an English mouth. (A laugh.) But how would the hon. gentleman prevent people from continuing to use the present weights and measures? He did not believe that Parliament could prevent it. A great deal had been said of the inconvenience of the present want of uniformity in foreign trade. No doubt, if it had pleased God that there should never have been a Tower of Babel, it would have been a great convenience to merchants and those who went about visiting different countries. (A laugh.) But the hon. gentleman could not bring about the uniformity he desired by Act of Parliament. (Hear.) What the hon. gentleman had said about France was not very encouraging. The new system was no doubt introduced in France by very scientific men, but it was carried after the French revolution, when everything that had formerly been accepted was torn up and displaced, and when the mind of the nation was engaged in setting up something that had not existed before. The hon. gentleman had not told the House how many years had gone over before the new system became settled in France; but, if he remembered aright, it was a great way down into the present century. The hon. gentleman told the house something about the spread of the French system over other countries, but he did not tell them that that was materially facilitated by the French occupation of those countries up to 1814; that all those countries had had a most debased coinage, and that it was a great benefit to them to have the French 20f. piece in their dealings with other countries. It was not pretended that the trade of this country with countries which had the metrical system was to be compared for a moment with our trade with countries which had it not, and, therefore, the adoption of the system would introduce great confusion in our transactions with the latter. (Hear, hear.) This Bill did not take, as one would have expected, the French metre as the unit of measure. The French, he believed, took the ten-millionth part of the distance between the equator and the pole, but the Bill proposed to take a certain multiple and decimal part of an inch. But, then, it would be necessary to lay down what an inch was, and if we wanted to know whether that was right we should have to march over to Paris to compare our standard with the French, and see if they agreed. There was a great deal of Gallo-mania going about this country and elsewhere just now; but he did not think it very convenient to have to settle our measures by going over to France. He had always believed that the size of the world was a fixed quantity, but learned pundits were of opinion that the world was growing. (A laugh.) If that were the case the quarter of it must be growing too, and then what was to become of the metre? (Laughter.) While the earth was growing, perhaps the scientific men in France might find some little variation in their metre. (Hear.) It would not be very easy to establish that Chinese exactness in all things which was expected. But coming to the practical part of the business, the tithe was levied on land measured by the acre, and was it a light thing to unsettle the tithe commutation? Was it a light thing to compel people, from the great millionaires down to the poor shopkeeper who had not a £5-note in the world, to get a new set of weights and measures? (Hear, hear.) The benefit to be obtained ought to be very great and certain before putting people to that inconvenience. (Hear, hear.) Then the foreign names would be very inconvenient, and would never suit the mouths of Englishmen. (Hear, hear.) It was proposed to remedy that by the introduction of a sort of Græco-Latin names, such as *decil* or *deil*, but if he knew anything of his countrymen they would soon get to corrupt such a word into devil. (A laugh.) It would be a very good thing no doubt to have uniformity in language and other things all over the world, but we had not arrived at that yet, and the question was whether the evil and inconvenience of the proposed change to the greater number of the people would not more than counterbalance the advantages. (Hear, hear.) He believed it would; that the uncertainty under the new system would be quite as great as existed at present, and he was therefore disposed to vote against the Bill.

Mr. LOCKE said he had paid some attention to this subject, and he concurred in several of the remarks that had fallen from the right hon. gentleman (Mr. Henley). No doubt great inconvenience would arise in the ordinary transactions of life if this system were introduced, but he did not think that such inconvenience existed in our mercantile transactions with foreign nations. His honourable friend who had introduced this Bill was no doubt familiar with that popular work

Murray's Handbook of France, and would remember that in the first pages of that book there were tables giving the comparative value of the coins of the two countries, and also the comparative proportions of their weights and measures. But there was no doubt our system of weights and measures was a most inconvenient one. It was perfectly immaterial what we took for our unit, the difficulty arose from the complicated way in which the unit was dealt with. The troy weight, for instance, was very different from the avoirdupois. In the one case 12oz., in the other case 16oz. made a lb., and then we had grains, and pennyweights, and drams, and to learn the distinction between these different weights was to the youthful part of the population one of the most painful processes which they had to undergo. (A laugh.) But if the unit were treated in a different way and were not twisted about, there would be none of the inconvenience which was now so much complained of; as an instance of the treatment of the unit, let the House take what was called the imperial measure of length: 12 inches make one foot, three feet one yard, and then five and a half yards one rod, pole, or perch. The right hon. gentleman seemed to think there would be some difficulty in finding the French standard and comparing it with the metre proposed by the Bill; but that was not the case. If the right hon. gentleman, the next time he was in Paris, would go to the Place Vendôme, he would find the metre there already made to his hand, painted in a most conspicuous place on the front of one of the government offices. (Hear, hear.) The right hon. gentleman was mistaken when he supposed that a metre different from the French was proposed to be adopted by this Bill. The inch and parts of an inch in the Bill made up the exact measure of the French metre. (Hear, hear.) But while he gave great credit to his honourable friend who had introduced the Bill, he thought that an effort should have been made to perfect the present law, with a view to uniformity. By the 5th and 6th Wm. IV., cap. 63, sec. 6, all local and customary measures were abolished, and a penalty imposed on persons selling by any denomination of measure other than by one of the imperial measures. If the section had stopped there the law would have been perfect, and uniformity in the use of measures clearly established, but at the instance of interested parties, the House was induced to introduce a proviso, which had entirely defeated the object of that section of the Act. The proviso was as follows:—"That nothing herein contained shall prevent the sale of any article in any vessel, where such vessel is not represented as containing any amount of imperial measure, or of any fixed local or customary measure heretofore in use." So that articles were now sold in all kinds and descriptions of vessels, whose capacity was undefined. In the year 1858, he (Mr. Locke) had introduced a Bill to amend the 5th and 6th Wm. IV. cap. 63, which Bill contained a clause for the regulation of the sale of fruit and vegetables, requiring that all vessels other than the imperial measures used for that purpose should have marked upon them the amount of imperial measure which they contained. This clause had been strenuously opposed by market-gardeners and others, and he (Mr. Locke) had met a deputation from these parties at the Board of Trade, before the right hon. gentleman the member for Oxfordshire, who took the side of the market-gardeners. However, the Bill had been defeated only by a majority of eight. He (Mr. Locke) had brought it in again the next year, and passed it, but with this clause omitted. Thus by this proviso in the section regulating measures, the intention of the Act had been entirely evaded; but how did the law stand with regard to weights? The 11th section commenced by defining what a stone should be—it was to consist of 14lb.—and at the end of the section a proviso was introduced, which stated that that was not to interfere with selling by the lb., or any multiple or aliquot part of the lb. A case came before Baron Martin at the Middlesex sittings, in Michaelmas term, 1853, which was afterwards argued in the Court of Exchequer, June 15th, 1854, and again in the Exchequer Chamber, June 30th, 1855 (Jones and Another *v.* Giles and Another, 10 *Exchequer Reports*, p. 119, and 11 *Exchequer Reports*, p. 393), in which a bargain had been made by what was called "the long ton," consisting of 2,400 lbs., but as that was not one of the legal weights named in the Act, one of the parties refused to complete the bargain. It was, however, decided, that "the long ton," after all, was a multiple of a lb., and that, if the Legislature had intended to exclude "the long ton," they should have introduced such words as "multiple of a lb. numerically expressed." Now, if the words "numerically expressed," were introduced into the 5th and 6th Wm. IV., a perfect certainty would be obtained. If the names given to weights and measures used in different places meant the same thing there would be no difficulty, but they meant a different thing in every different place. (Hear, hear.) The consequence was that, with respect to measures, the introduction of the proviso in the 6th section, and the absence of the words "numerically expressed" in the 11th, opened the door to all the inconvenience. There would no doubt be great difficulty in carrying such a system as was now proposed into effect. He would, however, support the second reading, hoping that at a subsequent stage some useful suggestions might be made. It was proved before the committee which sat in 1834, on the sale of corn, and over which the right hon. gentleman the present Speaker presided, that even in France people could not be induced to adopt the metrical system.

Mr. BAINES—It was not compulsory before 1837.

Mr. LOCKE—Well, there was one thing they all had to do with when they went over to France, though he did not know that his hon. friend (Mr. Baines) had, and that was the wine-bottle. (A laugh.) But every hon. gentleman knew that the French bottle, and more especially the German bottle, varied very much—it was growing "small by degrees and beautifully less," and he was satisfied that the ingenuity of that great nation would make it smaller and smaller, till it reached the vanishing point at last. (Laughter.) He was informed that in the country districts of France the people still used the weights and measures which their ancestors did, and such as Napoleon I., were he resuscitated, would have approved. In answer to a question it was stated some few nights back that the standards of weights and measures had not been reverified for the last thirty or forty years; and previously to his introducing a Bill in 1859, and which passed, being the 22nd and 23rd Vic. c. 56, he was informed that the models or copies of the imperial standards deposited in the several districts for the inspection of weights and measures in course of time became incorrect, and therefore, in that Bill a clause was contained, making it necessary that these models should at stated periods be reverified; but if the models were to be compared with the standards in the metropolis it was necessary that the latter should be ascertained to be correct. He was told, however, that such was not the case, and that these standards were bricked up in one of the walls of this house and never used for the purpose for which they were intended. This was certainly a very curious state of things, and should the New Zealander who was pictured viewing at some future time the ruins of this city discover them, he would no doubt exclaim, "That was a most wonderful and extraordinary people!" On one occasion he moved for a return of the number of convictions which had taken place throughout the country for selling by false weights and measures; and he was told that the return would be most voluminous. He consequently limited the return to the metropolis, and it was voluminous then. The great majority of the offences which had been committed were of the most trifling description, but he was informed that the magistrates considered that they were obliged to impose a fine, when it was shown that weights and measures were not accurate, and that they had no right to inquire whether the use of these inaccurate weights and measures was wilful or not. This was a very great hardship on tradesmen, and he wished that that House would attempt to perfect the English system before adopting a French one. He did not think that there was any difficulty at present about the imperial bushel. They all knew what its contents were; but the difficulty was in preventing persons from using a local or customary bushel, or something they chose to call a bushel. He wished his hon. friend, the proposer of the present measure, success in his attempt, and though he did not mean to say that he would support all its clauses, yet he regarded the Bill as a step in the right direction and capable of affording the opportunity of remedying the inconveniences of the present system. (Hear, hear.)

Mr. POLLARD-URQUHART observed that the hon. member for Oxfordshire had dwelt at considerable length on the inconveniences attendant upon the change now proposed, but it was satisfactorily established before the select committee that to secure uniformity throughout the whole of the United Kingdom some change was necessary. If that were so, why should not the best standard be adopted—a standard which would facilitate throughout the whole of Europe the commercial operations of this country? (Hear, hear.) The want of a decimal system was equivalent to a tax on mercantile transactions; and one of the witnesses before the committee stated that it was equal to a tax of £10,000 a-year on the profits of the London and North-Western Railway. In these days of free trade, was it right that this heavy tax should be continued on book-keeping and exchanges? It had been remarked by Sir R. Hill that, for want of a system such as the hon. member for Dumfries advocated, great difficulty was experienced in arranging postal treaties and fixing international rates of postage. This difficulty was felt more and more every day, and he sincerely hoped that the Government, who came into office very much on the free-trade principle, would give their support to the Bill of the hon. member for Dumfries.

Mr. ADDERLEY said that no one had denied that some simplification of the present English system was desirable. One could not hear of twenty various bushels, and fractional computations of relative values, without recognising the disadvantage under which English commerce labours. In reply to the hon. gentleman who spoke last but one, and who objected to going to France for a pattern before the system in England should be improved, he remarked that the best way to improve the system in England was to adopt the system in France, because it was a good system, and because, a world-wide commerce being the subject, it was a principal requisite to adopt a system which was already understood in a great number of countries. (Hear, hear.) It was better, he thought, when an object was confessed to be most desirable, to manifest wisdom in endeavouring to attain it, than to exercise wit in showing up the difficulties connected with it. He conceived that the difficulties suggested by the right hon. member for Oxfordshire were most far-fetched and absurd. The right hon. gentleman spoke of the French metre, and of some fantastical notion of the growth of the earth, which might throw out calculations based on a fraction of its meridian, but the right hon. gentleman must be aware that the basis of the English measure of length was the "seconds pendulum," and that that depended on gravitation, which would equally vary with his fantastical supposition. The introduction of a more simple system of weights and measures would be an enormous addition to the wealth of this country, as railways, by economy of time and facilitation of commerce, had been practically increments of national capital. (Hoar, hear.) The right hon. gentleman seemed to think that during the French revolution everything new was set up, and everything old was cast down, and he supposes everything new must be bad, and everything old good. This metrical system certainly was one of the wonderful products of the seething brain of revolutionary Europe, yet it must be admitted that hardly anything could be more beneficial than the simple process of calculation which was now under the consideration of the House; and it was a rational proposition, wherever it came from, that this country should take the unit which so many countries of the world had already satisfactorily adopted. (Hear, hear.) The metrical unit of measure at once applied to calculations of length, area, capacity, and weight; and with singular luck it was, within a tenth, identical with our existing yard, so that our adoption of the metre would little vary our old calculations. There was, of course, a difficulty connected with the introduction into this country of a new system and a new nomenclature, for their adoption must inevitably be repugnant to English conservatism, and could not be so easily enforced in this country as in nations where the Government was autocratic. The difficulties of a new nomenclature had been exaggerated and caricatured; but even Englishmen might as soon learn to drink a tentol as to invest in consols; the etymology was not more fanciful in one than in the other. He did not think that the hon. gentleman would pass his Bill as a compulsory measure. But there were other modes of facilitating the introduction of the system the hon. gentleman advocated. The system, in fact, was rapidly introducing itself by its own beauty, and by the necessity of the case. In all the large transactions of the country, and in various departments, such as the Mint, the Bank of England, and the Post-office, in short, wherever operations were on a very extended scale, or in concert with foreigners, it proved, not a matter of choice, but of necessity. In respect to science, it was impossible to have any other system, for the calculations were constantly growing much larger than they used to be, and the old system was not found sufficient for modern science. Students in mathematics were kept back in their pursuit, if they attempted to make use of the old system, by which the higher branches of mathematics could not be reached, and the adoption of a new system was also, in reference to international commerce, imperative. (Hear.) Under these circumstances he would suggest that all means should be made use of for facilitating the self-introduction of the new system. The children of the labouring classes were now in schools aided by the State, and the Department of Education had more or less the power of teaching that system to the next generation of the working men of this country employed as they would be all over the world. Diagrams illustrating its simplicity might be distributed throughout the kingdom. We were spending a million yearly now in conquering "the three r's" at elementary schools. This system would reduce one of them to easy conquest. Compound arithmetic would cease. Another mode by which the introduction of the new system might be facilitated would be by the Government going on a little faster in making their departments adopt it. Every department into which the system might be introduced would be found able to reduce the number of clerks, and consequently this became also a money question. (Hear, hear.) It had been alleged that the present law on weights and measures was rendered nugatory by the permissive clause which relieved from penalty those who used measures, though not imperial, provided they did not profess to be so. But that proviso seemed to him to suggest exactly the right way to proceed with any legislation in England on the subject. They might now legalize the metrical weights and measures, or even substitute them as imperial for those now so designated, leaving it a matter of permission to use others, but not as imperial or standard. An amending Bill of the existing statutes, to this effect, would, in his mind, be the most practical measure to attempt. He thought it was not necessary that the Bill should be compulsory in its enactments, and he

therefore suggested that it should be converted into a permissive measure. The decimal coinage must no doubt follow the adoption of the decimal system of weights and measures, but it was not necessary to complicate the matter by propounding the two subjects at once. (Hear, hear.)

Mr. **BAINES** would not detain the House more than a few moments, because he saw his hon. friend, the Member for Rochdale (Mr. Cobden), who, he hoped, would tell the House the results of his great experience of the English and French systems during the negociation of the late Commercial Treaty. He would however draw the attention of the House briefly to two points: the first was, the great number of eminent authorities who were in favour of the new and improved system. The Chambers of Commerce throughout the country had almost all petitioned in favour of the measure. The International Statistical Congress, composed of the most able statists of all nations, had also passed resolutions to the same effect. The jurors of the great Exhibitions of 1851 and 1862, comprising men eminent in trade, science, and official life, were almost unanimous in recommending the metric system, which was the simplest, easiest, most scientific, and perfect that had ever been devised. (Hear, hear.) It was of the utmost importance that a people so largely engaged in trade as we were should discard the present complicated, vicious, and irregular system for the new and improved one. M. Michel Chevalier had described the ease and celerity with which the metric system had been introduced into France. A law was passed in July, 1837, rendering it compulsory on and after the 1st January, 1840, but it was very generally in operation before that time arrived. (Hear, hear.) In 1841, M. Chevalier, in the course of a long journey, on inquiring of the postilions as to distances, found that they almost invariably calculated by kilometres and not by the old measure of postes. The second point to which he would refer was the very great gain there would be to the education of the young from the introduction of the metric system. It had been estimated, on reliable grounds, that as much as a year's schooling would be saved to the young by the adoption of the easy and improved method, instead of the present difficult one. As there were 2,000,000 of children in this country in the course of receiving their education, it was easy to conceive the immense saving of time which would thus be secured. (Hear, hear.) If put in an arithmetical form, it would give the startling result of a gain to the nation of two millions of years with every generation of children who passed through their schools. This would not indeed be a money saving, but it would not the less be a real saving, inasmuch as it would enable the young to acquire other branches of knowledge and a more perfect education. He thought, therefore, the advantages of the new system would be vast and permanent, and such as immeasurably to outweigh the inconveniences of the change. (Hear, hear.)

Sir M. **FARQUHAR** observed that the committee comprised representatives from each division of the empire—England, Scotland, and Ireland—who had come almost unanimously to a conclusion in favour of the metric system. He supposed his hon. friend would accept the modifications which had been suggested, and would withdraw the compulsory clauses of his Bill. If the system were gradually introduced, it might, in the course of time, be established as a whole. The extraordinary diversity of weights and measures which now prevailed was intolerably perplexing. Professor Leone Levi, in an able pamphlet on the subject, observed :—

> "For measures of length we have the ordinary inch, foot, and yard. In cloth measure we have yards, nails, and ells. There are four different sorts of ells. For nautical purposes we have fathoms, knots, leagues, and geographical miles, differing from the common mile. The fathom of a man-of-war is 6 feet; of a merchant vessel, 5½ feet; of a fishing smack, 5 feet. We have also the Scotch and Irish mile, and the Scotch and Irish acre. There are several sorts of acres in the United Kingdom, and there are a great variety of roods. We have in almost every trade measures of length specially used in those trades. For the measurement of horses we have the hand; shoemakers use sizes; and we are compelled to adopt guages where the French use the millimetre. The guages are entirely arbitrary. The custom of the trade is the only thing which would decide the question in case of dispute. For measures of capacity we have twenty different bushels. We can scarcely tell what the hogshead means. For ale it is 54 gallons; for wine 63. Pipes of wine vary in many ways; each sort of wine seems to claim the privilege of a different sort of pipe. For measures of weight we have about ten different stones; a stone of wool in Darlington is 18 lb., a stone of flax at Downpatrick 24 lb., a stone of flax at Belfast 16¾ lb., but it is also at Belfast 24½ lb., having in one place two values. The cwt. may mean 100 lb., 112 lb., or 120 lb. If you buy an ounce or a pound of anything, you must inquire if it belongs to Dutch, troy, or avoirdupois weight."

It was surely high time that these anomalies should be corrected. (Hear.) France, Holland, Belgium, Italy, Spain, Greece, and several other countries, even down to some of those of South America, had adopted the metric system, and others were anxious to introduce it. Why then should we not be able to do so? Some thought that our present system should be amended, and advised that we should be satisfied with the introduction of uniformity in our own weights and measures, whilst others urged that it would be far better that England should establish a system which would not only be uniform within our limits, but in accordance with that of those nations which had accepted the metric system. (Hear, hear.) The last course would certainly be the most desirable one. The whole world traded with us, and if a uniform system could be established between us and other nations, many existing difficulties would be corrected, and the interests of the trading community both here and abroad materially advanced. (Hear, hear.) His hon. friend said that the Emperor Napoleon had been a supporter of the metric system until he put on the Imperial purple, when he became a Tory. Now he (Sir M. Farquhar) did not know what a Napoleonic Tory meant, but his hon. friend was mistaken if he thought that the party among whom he had the honour to sit, now often again called the Tory party, was opposed to the introduction of improvements and well-considered reforms. *Stare super antiquas vias* was an expression which he cheerfully accepted in its meaning of opposition to sudden and organic changes; but where the road was difficult he for one was anxious to have it made easy, where it was rutty and heavy to have it made smooth and light. (Hear, hear.) There were no doubt difficulties in the way of carrying out the contemplated change, but they were not insuperable, and should not be permitted to daunt the supporters of the improved system. There was habit, and prejudice too, and the present system of weights and measures was so impressed upon the minds of those who used them in their different localities, that the change to another and uniform plan must necessarily require time. He trusted his hon. friend would bring his measure forward again next year amended as suggested, and he had no doubt he would then receive the support of the House and the country. This question had lately been much discussed in the literary and scientific institutions of the country. He had received a communication upon this subject, about a fortnight ago, from the members of the Literary and Scientific Institution in the town of Hertford, of which he had the honour to be one of the representatives, and this morning he had received a "refresher," and although it was not accompanied by the fee which gentlemen learned in the law knew something about—(a laugh)—he should be happy to give his willing support to the efforts of his hon. friend to introduce the metric system of weights and measures into this country. (Hear, hear.)

Mr. HUBBARD reluctantly fulfilled the ungrateful task of objecting to a measure prepared by men of great intelligence who were animated by no other wish than that of promoting (as recited in the preamble of the Bill) our foreign and our internal trade; yet he felt bound to express the conviction which he formed when on the Royal Commission on the decimal question, that while the decimalization of coins was, on the whole, inexpedient, the decimalization of weights and measures was out of the question. (Hear, hear.) The example of other nations had been cited, but it should be remembered that the decimal system was introduced on the Continent at the time of the French revolution, when men were prepared to accept the most extreme changes, and when it was contemplated to decimalize not only coins and weights and measures, but even the measurement of time. One argument in favour of the new system was its intrinsic perfectibility, but let it be remembered that in the attempt to decimalize time the reformers failed, for nature itself declared against them. He could not regard the decimal system as a revelation from Heaven, or believe that the present method could have grown up without possessing some convenience or advantage. (Hear, hear.) France had, by the aid of conquest, imposed the decimal system on some of her neighbours, and other adjoining countries had found it convenient to use it too. That was, however, no reason why England should adopt it. It had been said that it would extend by facilitating commerce. As a merchant he must express his belief that its introduction would not facilitate in the slightest degree any foreign trade which he carried on. (Hear, hear.) It would not diminish the price of any commodities that were imported, or affect their quantity. Of course the calculations of price and quantity would be more simple and more rapid under a decimal metric system, and thus, as far as mere counting-house work was concerned, some economy might be effected. (Hear, hear.) A house carrying on a large business might perhaps save the salary of a clerk. (A laugh.) As to the operations in Bills of Exchange the equivalents were so familiar to merchants that they experienced no difficulty now and needed no relief. The hon. member for Leeds had stated the saving of time in the education of the young through the use of the new method in very formidable figures. If it were true that a whole year was thrown away at present, then he would willingly agree to the change, but he could not admit the correctness of that statement. Could it be said that to teach a child to multiply and divide decimally constituted a sufficient arithmetical education? Admitting that the more complex rules now requisite for children to learn occupied an additional portion of their school life, was the time so expended wasted? Was it not rather well bestowed in improving their intelligence? ("Oh," and "Hear, hear.") The value of education did not consist in merely enabling a child to buy a pound of butter or an ounce of snuff, but in the development of his mental powers, so as to render him in after life a wise and useful citizen. (Hear, hear.) Therefore, he did not grudge this additional year spent at school, and could not allow that it was wasted. In considering the convenience of the new system it should not be forgotten that a vast number of small trade transactions were carried on by old women, children, and illiterate men in the markets, streets, and alleys of every large town. How would these people be able to adapt themselves to the change? Their monetary unit was the penny—their unit of weight was the pound—most of their staple articles of consumption were bought by the pound or by its aliquot parts, and paid for by the penny or its quarter parts. These standards, either of quantity or value, were familiar to their minds, and a change in either would produce a serious and universal annoyance. It was right that their case should be taken into account in dealing with this matter. Fifty years after the decimal system had been introduced into France it was found necessary to enforce it by a compulsory law. Was the House prepared to carry out this measure by imposing penalties on the great body of the people? Such measures might be very well for despots, but they did not suit the genius of the English people. (Hear, hear.) Even at this moment the system was not perfect in France. In parts of France the old weights and measures were still in use. Even in Paris one found that the bougies were practically sold by the old measure, for they were done up in packets of as many grammes as made the livre. (Hear, hear.) It had been said that the advantages of the metric system were permanent and positive, while its disadvantages were only temporary and accidental. He denied its advantages, and when it was said it would entail inconvenience only on the next generation or two, he must observe that that was really no small matter. (Hear hear.) It had been said that Lord Overstone had expressed the opinion that the decimalization of weights and measures and of the coinage should go together; but he was able to state that his lordship meant only that a perfect system would involve that duplicate decimalization, and did not in the least intend to give any countenance whatever to a change in either respect. (Hear, hear.) If the House approved the decimalization of weights and measures, the same process would have to be applied to the coinage, and great expense as well as inconvenience would accompany the recoining of the currency. On the whole the balance of advantages seemed to him to be on the side of leaving things as they were. (Hear, hear.) Those who would gain anything by the change would be those who could best endure the drawbacks of the existing system. Trade did not want it, science was independent of it, and those who would suffer most disadvantage from it were the people who carried on the petty but by no means unimportant industry of the country. (Hear, hear.)

Mr. COBDEN—There are two subjects before us which have been rather inconveniently confounded in the course of this discussion—the question of decimalisation, and the question of adopting the metric system. You may have the decimal system without the metric system. I think there is a unanimity of opinion in favour of the decimal system in preference to our present mode of notation. There may be the exception of Lord Overstone, but whenever I am advocating a reform, especially one about which the common sense of the community is pretty well agreed, I have made up my mind not to have the honour of the company and countenance of Lord Overstone. Looking to the evidence given before the committee on which I sat last year, there is a weight of authority in favour of the decimal system, on scientific, educational, and commercial grounds, such as I hardly ever before saw equalled in any committee. There was, for example, the evidence of Professor De Morgan, the great mathematician and actuary. He was not of opinion that the metric system should be adopted, but he declared—and it is a fact that should be deemed important in this discussion—that boys would save one-half the time they spent in the study of arithmetic, by following the decimal instead of the present system. The Rev. Alfred Barrett, a clergymen who instructs youths for the Artillery service, made the following statement to the committee :—"It appears to me that the work of education in the French Military Academy is much more forward than ours, and arises very much from the time of the juvenile pupils being lost in the stupid system of arithmetic which we adopt." He was asked, "How much do you think the time spent in education would be shortened by adopting the decimal system?" He answered, "Two years." He was asked if learning according to the decimal system would be more agreeable, and his answer was, "Yes, I think so, and more complete." Dr. Farr produced a letter from Lord Brougham, who had collected the testimony of schoolmasters on the subject, and he had come to the conclusion that one-third of the time spent by boys at school in learning arithmetic would be saved by adopting the decimal system. My friend Mr. Edwin Chadwick has given his attention to a new system of education for the poorest class of schools, by which he proposes, without any diminution of the amount of their education, to shorten the time for the instruction of children to three hours a day instead of six. Mr. Chadwick says that more than one hour out of three is wasted by the poor children learning arithmetic, in consequence of the complicated system which they are taught. The gentleman who just sat down (Mr. Hubbard) has offered a most astounding argument in defence of his views, he is in favour of puzzling the children's heads with the present system of arithmetic, for the purpose of exercising their brains; but does not the hon. gentleman know that if you give to those poor children greater facilities for studying the simple rules of arithmetic, they will be able to mount up to the compound rules, or even to the higher regions of mathematics? They will be stopped soon enough by the rules of mathematics, which will abundantly exercise their brains; but let it be done for a useful object, rather than for the mere purpose of tormenting them. I commend to the hon. gentleman those doggerel lines, written, no doubt, by some despairing urchin, in a moment of distraction:—

> "Multiplication is vexation,
> Division is as bad;
> The rule of three it puzzles me,
> But practice drives me mad."

The question of education is mixed up with the question before us in this way:—you cannot teach children the decimal system with any advantage unless it is to be available in the ordinary transactions of the affairs of life. My hon. friend the member for Staffordshire has been arguing for a permissive and temporising treatment of this measure. He pities the boys who are learning the present system of arithmetic, and says he would allow the decimal system to be permissive; but what would follow? The poor boys would learn the decimal system and the present system, and that would be no relief to them. Now I apprehend that what will come out of this discussion is this: you must either adopt the whole of it or not take a step in it at all. You must adopt the system of decimalising your coins and your weights and measures. Then comes the question, What mode of decimalisation will you adopt? The right hon. gentleman the member for Oxfordshire says he is in favour of taking a foot measure for decimalisation, but objects to the proposed metre as outlandish. I think he has some objection to the origin and source from which the new metre is to come. I suppose the right hon. gentleman would not object to mechanics or scientific men decimalising their foot rules and carrying it through a calculation of measurements; but what is the use of decimalising a foot or a yard unless you decimalise all the measures into which these merge and to which they have relation? If you agree to decimalise your foot, you must decimalise your inch and yard to make it of any value; and if you decimalise your pound you must decimalise your ounce and other weights. If you adopt the decimalising system at all, about which everybody is agreed, you must enter upon a complicated change of your own weights and

measures that will be just as troublesome to you and cause as much embarrassment to your trade as if you adopt the French system. What is the French system? The hon. member for Leeds said that I had an opportunity of forming an opinion respecting the systems of France and England. I had that opportunity, and probably should not have taken part in the discussion of this question if it had not been forced upon my attention. I was engaged, for I believe six months, in the constant study and conversion of English weights, measures, and prices into French weights, measures, and prices. To say I felt the disadvantage of our system as compared with that of France, and felt mortified and annoyed, would not express my feeling at the time; I felt humiliated. The one is simple, symmetrical, logical, and consistent; the other is dislocated, complicated, uncouth, and incoherent. We need not be alarmed about the French system because it is French. The French system is not founded upon anything peculiar to France. Before the French metric system was adopted, the French Government, in 1790, invited the English Government to send learned Fellows of our Royal Society to France, to devise a system of weights and measures for the world. We declined to interfere, and what is the result? Instead of taking anything peculiar to themselves, the French Government adopted a cosmopolitan standard. They took for their unit of length, weight, and capacity, a geographical and mathematical fact, the ten-millionth part of the quarter of the circumference of the globe, or a little more than an English yard. There is nothing in that to excite the jealousy of Englishmen. If we were asked to take the meridian of Paris for the calculation of the longitude in our navigation tables you might resent it, but in this case a cosmopolitan standard has been adopted which has no special reference to France. You may adopt the system, therefore, without making the slightest concession to French ideas. I don't know that I could explain the advantages of the system more clearly than by quoting a few words from the evidence of M. Chevalier. He said that "the evidence in favour of a good spinning or weaving machine, instead of an obsolete one, would be also evidence in favour of the metric system of calculation." If it were discovered by a traveller in France that the ploughs or scythes used by our agriculturists were inferior to those used in that country, we should instantly change the form of those agricultural instruments, and adopt the model from abroad. But here is a tool that is not merely used by our agricultural labourers in cultivating the land: in every family in the United Kingdom it is in daily use; it offers facilities for saving one-half the time in arithmetical education, and one-third or one-fourth of the time spent in all the transactions in which you are to make use of this tool—and yet there is a difficulty set up in adopting it. Its adoption is resisted by the *vis inertiæ* of the country. It is recommended by all the highest authorities amongst those who have had occasion to use it. It is recommended by Sir Rowland Hill, because it is most desirable for the arrangement of his postage. It has been recommended by Dr. Farr, the head of the Statistical Department of the Register of Deaths, Births, and

Marriages. It is recommended by Mr. Anderson, the head of your gun factory at Woolwich, and by Mr. Graham the Master of the Mint. It is stated that Mr. Whitworth finds the decimal system necessary for minute computation and admeasurement. The metric system has been petitioned for by the Associated Chambers of Commerce. All the bodies and classes most likely to be served by using this instrument have petitioned to be allowed to use it; and are we to meet them with the argument that the old system answers very well— we will go on in the ancient way—we object to take anything from the French? Are the whole interests of the country to stand still on that account? If we were satisfied with things as they are, I could understand why we should be indifferent to a change, but what places us completely in the wrong is that we are all agreed that our present system of weights and measures is unsatisfactory. I have been asked whether the French people have universally adopted the metric system, and I say no. They have, in remote country districts, persons who still estimate the extent of their land by the old measurement; but there is this difference between France and England. The French have no idea of abandoning their new system, which is being rapidly adopted by the other nations of the continent, and only waits our adoption to become the system of the civilised world; all they want is time to make those poor people who adhere to the old method better acquainted with the new one, whereas, though we are dissatisfied with our system, we are still looking about for the means of remedying it. Our weights and measures are supposed to be a part of Magna Charta, and to be founded upon a declaration of the Barons at Runnymede, more than 600 years ago, who said there should be only one standard in England; but we have actually about 150 measures, which, though illegal, are constantly being used in defiance of the law. We have also penalties to compel the use of legal weights and measures, but they are not inflicted. What is the reason why we have never had one uniform system of weights and measures? It is that we have never presented to the public a motive for uniformity. We have passed a law that the Winchester bushel should be abolished and the Imperial bushel used in its stead, but the Imperial bushel offered no more facilities in measurement and calculations than the Winchester bushel. So in other cases. But the distinctive merit of the present proposal is that it promises a great economy of time and labour in the adoption of the decimal and metric system. Above all, it appeals to the youth of the country, which I consider a point of vast importance. It has been said that there can be no immortality for authors unless their books are read by the young. So it might be said in this case, that the greatest hope of success from the adoption of the decimal and metric system is founded upon the appeal made to the sympathy and interest of every young person in the country. The logical sequence with which the decimals in the French metric system follow one another afford satisfaction to the reasoning faculties; it gives a constant triumph to the reason; but we have nothing of the sort in our illogical, inconsistent, and dislocated system. I might compare the distinction between the two systems to the difference between mining in a country full of "faults," and mining in a district where there is one continuous vein. The French are generally considered a more logical people than the English. I believe they are so, and I am sometimes disposed to attribute the fact to their having this decimal system of calculation. I admit that we should have considerable difficulty in the transition, but think that those difficulties might be successfully encountered by the Board of Trade, under the guidance of my right hon. friend the member for Ashton, who has a mind peculiarly suited for dealing with such a question. At the very outset the Board of Trade would have to prepare and issue a table of equivalents in order that the people might know by comparison with the past what they were buying. Such a table could be produced with the greatest ease, and in a very short time there would be no occasion for its use at all. It was in evidence that an English workman going to Paris mastered the French system in a month, and one witness has stated that a man of superior intelligence might master it in two days. Now that our old disputes as to financial and commercial questions are disposed of, I think the President of the Board of Trade could not do better than take this matter in hand. Lord Chesterfield endured in history as a great name very much from having been the means of introducing the Gregorian Calendar. I trust that the President of the Board of Trade, in addition to his successful labours in the cause of free trade in corn and free trade in newspapers, will do his utmost to obtain what certain boys who threatened to petition the House have called free trade in arithmetic.

Mr. FERRAND remarked that a small shopkeeper with a capital of £50, had probably spent £3, £4, or £5, in the purchase of weights and measures. It was now proposed to sweep away the whole of that property. He submitted that if the Bill was to be compulsory it ought to be compensatory also. (Hear, hear.) The hon. gentleman, amid cries of "Question," called attention to the large sums demanded from hawkers for licenses, and commended the subject to the attention of the Chancellor of the Exchequer.

Mr. M. GIBSON confessed that he did not feel very sanguine of being able to induce the people of this country to conform without great resistance to any considerable change in their weights and measures. (Hear, hear.) Such alterations if desirable could, of course, be effected, but they ought to be introduced in a cautious manner and by successive steps, so as to cause as small an amount of loss and inconvenience as possible. He had not a word to say against the decimal and metric system of France; on the contrary he thought it convenient, neat, and beneficial; but the question was whether the House would give its assent to a compulsory measure which enacted that, from and after a certain time named in the clauses, every person in the United Kingdom who did not use in transactions of trade, whether of an extensive or whether of a petty character, the metric system, should be liable to a penalty of 40s. (Hear, hear.) Now, his own opinion was, that in such a case as this we must endeavour to fit matters a little to society, and must not expect that society would all at once adapt itself to new legislation unless some public conviction existed in its favour and unless the minds of the people were prepared to co-operate with the law. That was the opinion of the select committee, which, while recommending that the metric system should be rendered legal, declared that no compulsory measures should be resorted to unless they were sanctioned by the general conviction of the public. (Hear.) What evidence had we that such a change as that proposed by the hon. member for Rochdale was sanctioned by a general conviction of the public? None whatever. Many steps ought to be taken before we ventured upon compulsory legislation, which, if attempted prematurely, must have the effect of throwing back the change that many desired to see accomplished. Such has been the case in France, where 50 years expired after the premature decree of the National Assembly before the metric and decimal system was brought into general operation in the time of Louis Philippe. There could be no doubt of the advantage of the decimal system in all matters of accounts, but he contended that we could not make that system the only mode of division which persons should be compelled to use under a penalty. He had no objection to any Bill, if such should be thought necessary, which should legalize and license the use of the decimal division; but be should be sorry to see any measure passed to confine men exclusively to that system and prevent them from having recourse, if their convenience required it, to the binary system now in ordinary and daily use. Uniformity in weights and measures, they would all agree, was most desirable; but what was their experience of previous attempts to enforce it? We had now established by law two simple and primary units, the standard yard for length and the avoirdupois pound for weight; and from these all our other legal weights and measures were derived. The 5th and 6th of William IV., cap. 63, enacted that any person using any weight or measure other than those authorised by that Act should be subject to a penalty not exceeding £5, and also that all contracts made in other measures or weights should be null and void. Yet there was, no doubt, at present a great number of local and customary measures and weights in use in this country, in Wales, and in Scotland, contrary to that statute, although common informers had power to sue for the penalty which it imposed. Why then was the law not enforced? He could not give any other reason than that it was found an extremely difficult thing to enforce, in any brief space of time, any great change in weights and measures throughout the country, and that in many districts public opinion would not sanction the prosecution of persons for adhering to usages with which they had been accustomed to conduct their business with convenience and safety. In the metropolis and other large towns no infractions of this law, perhaps, took place, and the introduction of railways and other changes had a tendency to lead to the voluntary adoption of uniformity in weights and measures on account of its superior convenience. It was better, therefore, to trust to the gradual appreciation of the advantages of an improved system, than to seek, by the rough and compulsory expedient of legal penalties, to bring about a change all at once. He agreed with the hon. member for Rochdale that it was the duty of all who approved the decimal and metric system to do what in them lay to prepare the public mind for receiving it. But he was convinced that, although those persons, comparatively few in number, who were engaged in the foreign trade, and whose transactions were generally on an extensive scale, might be favourable to this change, yet, from the innumerable petty traders and shopkeepers scattered throughout the country, any sudden attempt to make it compulsory would meet with a general resistance. He could not, therefore, assent to a compulsory enactment, nor could he see his way, if passed, to its practical enforcement. On such a subject they must proceed by single steps, and if the hon. member for Dumfries would withdraw this bill, and introduce another of a merely permissive character, that might by degrees familiarize the public mind to the idea of the proposed change, and pave the way for further advances in the same direction hereafter. Although himself in favour of the theory of the metric system, all the scientific witnesses examined before the committee did not support it. Professor De Morgan, while strongly advocating the decimal system for account keeping, regarded the metre as not a good unit of length. Professor Airey also thought that uniformity and harmony with the system of foreign countries might be purchased at too high a price. Still, of the practical difficulties of introducing into trade a new system, the scientific men were not such good judges as the Chambers of Commerce. But it would not be fair to let the House suppose that there had been unanimity among the philosophers, and even at the present moment several of them inclined to the opinion that it was not desirable to adopt the metre as our unit. With regard to a question which had been put to him as to the testing of the standards, the Act provided that the local standards should be compared with the standards in London, but it contained no provision for the periodical verification of the working standards in London by comparison with the primary standards kept in a stone box, which were the units and constants upon which all our weights and measures were by law to depend. He presumed, however, that the authority of the Government would be sufficient to warrant that comparison being made; and, as the matter was one of great importance, it would not fail to receive the attention it deserved. The International Statistical Congress which sat in London two years ago appointed a committee to inquire into the best means of overcoming the obstacles which prevented the adoption of the metric system in various countries. He would suggest, therefore, that it would be well for the hon. member for Dumfries to wait till that committee had presented its report to the next meeting of the Congress before seeking to legislate on this subject. He saw that Portugal, after ten years of hard preparatory work, had just arrived at the stage for compulsorily introducing the metric system. He was quite willing to help individually as a pioneer in paving the way for the adoption of that change in this country, but he believed that if he were to attempt, by a sort of surprise, to compel people by law in all parts of the country to throw away their present weights and measures, and to provide themselves with new ones based on wholly novel principles, he would require the assistance of a body of police of no ordinary magnitude.

Mr. BAZLEY thought the President of the Board of Trade, in his very plausible speech, had conjured up imaginary difficulties. In the departments of the Customs and Excise the decimal system was already largely used; and where would be the difficulty of applying the same principle to the transactions of the general public? Many of the working men of Lancashire were now in the habit of computing upon the decimal system in the discharge of their ordinary duty. (Hear, hear.) He should support the Bill, because it would materially economize time and promote the wealth of the country.

Mr. ROEBUCK said the right hon. gentleman had recommended the hon. member for Dumfries to withdraw the Bill and bring in another of a permissive nature. He would suggest that the House should agree to the second reading before the Bill was withdrawn (hear, hear)—because by that course they would at least have affirmed its principle.

The CHANCELLOR of the EXCHEQUER said that unhappily compulsion was a vital portion of the measure, and could not be separated from its principle. (Hear, hear.) To compulsion in this matter the Government were not prepared to accede, and they would be only deluding the House if they for a moment assented to the second reading of a measure involving compulsion as a means of giving effect to the decimal system.

Mr. R. HODGSON said that the compulsory power was not the principle of the Bill, but only the means by which it was to be carried out. The hon. member for Dumfries should state, before they divided on the second reading, whether he would agree to change the compulsory provision into a permissive one, and in that case, after the second reading, the Bill might be committed *pro formâ*, and altered and printed, and circulated for consideration by the country during the recess.

Mr. J. B. SMITH said that he was of opinion, with the hon. member for Tynemouth, that the Bill should be read a second time, because the principle of the Bill was the adoption of the metric system of weights and measures. Whether its adoption was to be enforced or permissive was a matter of detail, and might be dealt with in Committee on the Bill. The President of the Board of Trade had observed that the philosophers were not agreed on the metric system. It was true that there were two philosophers examined before the committee on weights and measures, who were opposed to the metric system. One was in favour of the decimalization of our existing weights and measures; the other, the Astronomer Royal, was opposed to any change at all. Now, he knew that the House had great respect for the opinions of philosophers: he was, therefore, desirous of reading the evidence of the Astronomer Royal before the Committee, from which they would be able to judge of the practical value of his opinions on this subject. This learned gentleman was asked, "In the case of a Railway Company having hundreds of charges to make every day for the carriage of goods, which may be of every conceivable weight from a pound up to 100 tons, in such a case having cwts. and lbs. as part of the weight, do you suppose that any table could be devised that would aid their calculations." Answer—"I never had to send goods by railway, and therefore I cannot say." Q.—"Then I tell you that they charge tons, cwts. and lbs. Do you not think that in France, where a railway has 1,000 kilogrammes for transmission, they would find their calculations greatly facilitated by dividing the 1,000 kilogrammes by 10?" A. "Yes." Q. "Is not a large amount of the business of the country the railway carriage of the country? A. No: it is a good deal, but it depends—that is, the convenience or inconvenience depends—entirely on the extent to which large measures or weights, and small ones, are used at the same time." Q. "Of course it does?" A. "Generally speaking in all business I have any acquaintance with, they are not used much together." Q. "You do not dispute that the railway companies charge the weight by the ton, cwt., qrs., and lbs.? I do not know how far they go, but I should think they would not go below the quarters. It would depend entirely upon the extent to which the small weights are combined with the large weights." Q. "Assuming that the railway companies charge below the quarters, then do you think the adoption of the decimal system would be an economy of time? A. "Yes; but it scarcely would if they do not go below the quarters." No doubt the opinions of so distinguished a philosopher as the Astronomer Royal on questions connected with his own pursuits is entitled to great deference; but so much of his life is spent among the stars that he appears to have little practical acquaintance with what is passing in the world below. There was however another philosopher examined before the Committee, Professor Miller, of Cambridge, no less distinguished than the others, but possessing the advantage over them of a practical acquaintance with the subject of weights and measures. Professor Miller was one of the members of the Committee for the restoration of the lost standard, and to him was entrusted the restoration of the standard of weight. He is of opinion that the metric system should be adopted in the place of our present system of weights and measures, because it is a perfect system, and because it is now adopted by a very large portion of the world. He was asked by the hon. member for Staffordshire, "Do you find in the course of your learned pursuits that our present system of weights and measures interferes with scientific investigation in any way?" He answered, "Not in the least: they are so complicated it is quite impossible to use them. The balance makers provide balances made for accurate purposes with decimal weights of some kind." It appears, then, that scientific men cannot use our present system of weights and measures; the Astronomer Royal himself never uses them in his calculations; there has been no reason urged why the public should be condemned to use them except that any change would be attended with temporary inconvenience and would be especially distasteful to old women. He (Mr. Smith) did not believe that the English people were less intelligent than the Dutch, Swiss, Spanish, or those of any other country which had adopted the metric system with so much public advantage, and he therefore hoped the House would allow the Bill to be read a second time.

Mr. GRIFFITH was ready to support that part of the measure relating to decimal computation, but was unwilling to pledge himself to the adoption of the metric standard.

Colonel SYKES said, as a member of the Committee on Weights and Measures, and concurring entirely in the recommendations of the committee, he might not have risen after the conclusive statements that had been made; but some observations of the right hon. member for Oxfordshire needed remark. The right hon. gentleman said that the metric system in France had originated in the Revolution, when there was a mania to abolish every previous institution, and its adoption had been abrogated by Napoleon the First. The fact was that as early as the 8th May, 1790, a commission of the Academy of France was ordered by the Constituent Assembly, upon which sat academicians and mathematicians whose names have taken a place for ever in science. The commission at first thought of adopting the length of a pendulum vibrating seconds in the meridian of Paris as the basis or standard; but as gravity is not uniform throughout the globe, the plan was given up, and an immutable standard of the ten-millionth part of the quarter of a meridian was adopted. On the 26th March, 1791, the recommendation of the Commission of the Academy was sanctioned; but it was not until the 1st August, 1793, that the new system, with its decimal notation, became law, and it was slightly altered in 1795. It continued in operation until 1801, when some relaxation took place owing to Napoleon's opposition to the system; and in 1812, when Emperor, he let the people substitute the old terms; but under Louis Philippe it was found that such confusion had ensued, that the Chambers restored the metric system, which has continued in operation ever since. The argument of the right hon. gentleman, therefore, told against himself, for so far from the metric system being abandoned because it would not work, it was in fact restored because of the confusion consequent on its abandonment. The right hon. gentleman said also, that the majority of the European nations had not adopted the metric system, but this was not the fact; Russia, European Turkey, and Wallachia, were the only European countries where there had not been a movement in its favour. The three Scandinavian nations, Sweden, Norway, and Denmark, had recently passed resolutions in its favour, and even in Russia the thin end of the wedge was being inserted. Surely, therefore, his right hon. friend would not wish to have England left in the same category with Turkey and Wallachia. England had a great commercial interest in the metric question; for the value of her trade annually in those countries where the metric system prevailed was 55 millions sterling, while in those countries in which the metric system did not exist, the value of the trade was only 24 millions per annum. A practical illustration of the economy of time and figures, by the use of decimals in arithmetical calculations, had not been given by the speakers who had preceded him, and he would offer one from a paper he had in his hand. It was the determination of the value of 5760 yards of calico at 3⅞d. per yard, by compound multiplication, by the rule of three, by practice, and by the aid of a decimal table; the answer of course was the same, viz., £93, by each mode; but compound multiplication required 43 figures; the rule of three, 44 figures; practice, 33 figures; and by the aid of the decimal table only 14 figures were required. This was conclusive. Great stress had been laid upon the difficulties attending the introduction of the metric system, particularly in respect to the prejudices against the Græco-Latin terms to be used. But these terms might be dispensed with, and our own old and familiar monosyllabic "ton," "pound," "ounce," "quart," "pint," &c., be retained, the present quantities of each designation only being altered, to make them correspond with the terms and quantities in the metric system. The objections to the Bill on account of its penal clauses have no force, for every "Weights and Measures Bill" already passed has its penal clauses, which are constantly put into operation. Moreover, with respect to all the difficulties alleged, every nation which has adopted the metric system equally experienced them, and it cannot be believed that England would fail to do what other countries had succeeded in doing. He would therefore heartily vote for the second reading of the Bill.

Mr. W. EWART, in reply, said he was willing to accept the Government proposition if they would undertake to use their endeavours to prepare the country for the change by introducing the metric system into schools, and in any other manner that might be open to them.

Mr. GIBSON said he could not offhand pledge the Government to any particular course, nor could he speak for the Committee of Privy Council.

The SOLICITOR-GENERAL pointed out that the Bill was essentially a compulsory measure, for it spoke throughout of the unity of weight and of capacity, and did not say that persons might use that unity or not as they pleased.

The House then divided, when the numbers were:—

For the second reading	110
Against	75
Majority	—35

WEIGHTS AND MEASURES (METRIC SYSTEM) BILL.

Order for Second Reading read. Motion made and Question put, "That the Bill be now read a second time." The House divided:—Ayes, 110; Noes, 75.

Ayes.

Adam, William Patrick
Adderley, Rt. Hon. Charles Bowyer
Agnew, Sir Andrew
Baines, Edward
Barnes, Thomas
Bazley, Thomas
Blake, John
Browne, Lord John Thos. (Mayo)
Buchanan, Walter
Buckley, General
Buller, James Wentworth (Devon, N.)
Caird, James
Cave, Stephen
Churchill, Lord Alfred Spencer
Clay, James
Clifford, Colonel (Hereford)
Coningham, William
Corry, Rt. Hon. Henry Lowry
Dalglish, Robert
Davie, Colonel Ferguson (Barnstaple)
Du Pre, C. George
East, Sir James Buller
Edwards, Colonel
Elphinstone, Sir Jas. Dalrymple
Enfield, Viscount
Ewart, Joseph Christopher (Liverpool)
Ewing, Humphry Ewing Crum
Fane, Col. John William
Farquhar, Sir Minto
Fenwick, Henry
Finlay, Alexander Struthers
Fitzwilliam, Hon. C. W. W.
Foley, Henry W.
Forster, Wm. Edw. (Bradford)
Gard, Richard Sommers
Gore, Jno. Ralph Ormsby (Salop N.)
Goschen, George Joachim
Gower, Hon. F. Leveson (Bodmin)
Grenfell, Henry R. (Stoke)
Greville, Colonel Fulke
Gurney, Samuel (Penryn)
Hadfield, George
Hankey, Thomson
Hassard, Michael
Hay, Sir John Charles Dalrymple
Hennessey, John Pope
Hervey, Lord Alfred
Hibberd, John Tomlinson
Hodgkinson, Grosvenor
Hodgson, Richard (Tynemouth)
Holland, Edward
Hood, Sir Alexander Acland
Horsfall, Thomas Berry
Ingestre, Viscount
Jackson, William
Jervoise, Sir Jervoise Clarke
Jolliffe, Rt. Hon. Sir W. J. H. (Petersfield)
King, James King (Hertfordshire)
Laird, John (Birkenhead)
Leatham, Edward A.
Lefroy, Anthony
Lewis, Harvey
Liddell, Hon. Henry George
Lindsay, Wm. Schaw (Sunderland)
Locke, John
Lyall, George
Mackinnon, Wm. Alexander (Lymington)
Maguire, John Francis
Manners, Lord George J. (Camb. Co.)
Martin, Phil. Wykeham (Rochester)
Massey, William Nathaniel
Mildmay, Humphrey Francis
Morrison, Walter
Nicol, William
Ogilvy, Sir John
Padmore, Richard
Paget, Chas. (Nottingham)
Pakington, Right Hon. Sir John
Patten, Colonel Wilson
Pender, John
Pennant, Hon. Colonel
Pilkington, James
Pollard-Urquhart, William
Ponsonby, Hon. Ashley
Potter, Edmund
Pugh, David
Puller, C. W., Giles
Ramsden, Sir John William
Raynham, Viscount
Repton, George William John
Roebuck, John Arthur
Scholefield, William
Seeley, Charles
Sheridan, Henry B. (Dudley)
Smith, John Benjamin (Stockport)
Smith, Abel (Herts.)
Somes, Joseph
Steel, John
Sturt, Hen. Gerard (Dorset)
Sykes, Colonel Wm. Henry
Taylor, Colonel (Dublin Co.)
Tite, William
Tottenham, Lieut.-Colonel Charles George
Trelawny, Sir Jno. Salusbury
Warner, Edward
Watkins. Colonel Lloyd
Weguelin, Thomas Matthias
Whalley, George Hammond
Whitmore, Henry
Williams, Wm. (Lambeth)

Tellers for the Ayes, Mr. William Ewart and Mr. Cobden.

Noes.

Addington, Hon. Wm. Wells
Arbuthnott, Hon. General
Atherton, Sir William
Ayrton, Acton Smee
Baillie, Henry S. (Inverness-shire)
Bentinck, George W. P. (Norfolk West)
Bentinck, G. Cavendish (Taunton)
Blackburn, Peter
Bonham-Carter John
Brown, James (Malton)
Bruce, Henry Austin (Merthyr Tydvil)
Childers, Hugh Culling Eardley
Cholmeley, Sir Montague John
Cowper, Rt. Hon. Wm. F.
Cox, William
Davie, Sir H. R. Ferguson (Haddingtonshire)
Duff, Mount Elph. Grant (Elgin)
Dundas, Right Hon. Sir D. (Sutherland)
Egerton, Sir Philip Grey (Cheshire S.)
Evans, Sir De Lacy (Westminster)
Farrer, James
Fellowes, Edward
Foster, Wm. Orme (Staffordshire S.)
Galway, Viscount
Gavin, Major
Gibson, Right Hon. Thomas Milner
Gilpin, Charles (Northampton)
Gladstone, Rt. Hon. Wm.
Gregson, Samuel
Griffith, Christopher Darby
Henley, Right Hon. Joseph Warner
Henley, Lord
Herbert, Rt. Hon. Henry A.
Holmesdale, Viscount
Hotham, Lord
Hubbard, John Gillibrand
Humberston, Philip Stapleton
Hutt, Rt. Hon. William
Johnstone, Sir Jno. (Scarboro)
Kekewich, Sam. Trehawke
Knatchbull, W. Francis (Somerset E.)
Knatchbull, Hugessen E. (Sandwich)
Layard, Austin Henry (Southwark)
Marjoribanks, Dudley Coutts
Mills Arthur (Taunton)
Mitford, William Townley
Moncrieff, Rt. Hon. James
Morris, David
Mowbray, Rt. Hon. John Robert
Murray, William
North, Colonel (Oxfordshire)
Paget, Lord Clarence (Sandwich)
Palmer, Sir Roundell (Richmond)
Parker, Major Windsor
Peel, Rt. Hon. Frederick (Bury)
Ridley, Sir Matthew White
Robartes, Thomas James Agar
Rowley, Hon. Richard Thos.
Russell, Arthur (Tavistock)
Salomons, Mr. Alderman
Shelley, Sir John Villiers
Smith, Augustus (Truro)
Smollett, Patrick Boyle
Stansfeld, James
Sullivan, Michael
Tollemache, John (Cheshire S.)
Trevor, Lord Arthur Edwin Hill
Turner, Charles (Lancashire S.)
Vandeleur, Colonel
Vernon, Harry Foley
Villiers, Rt. Hon. C. Pelham
Wallcott, Admiral
Walter, John
White, Luke (Kidderminster)
Wynn, Charles Watkin (Montgomeryshire)

Tellers for the Noes, Mr. Brand and Sir William Dunbar.

THE FOLLOWING TRACTS,

Published by the Association, are sold at the Office, 10, *Farrar's-buildings, Inner Temple-lane ;*

AND BY BELL AND DALDY, 186, FLEET-STREET.

1. Prospectus of the Association. 1d.
2. *Narrative of the Origin and Formation of the International Association. By James Yates, Esq., Vice-Pres. 1s.
3. Concise Narrative of the Origin of the Association. 1d.
4. Account of the Plan, Objects, and Progress of the International Association. By Samuel Brown, Esq., F.S.S., &c.
5. Rules and Regulations. 1d.
6. First Report of the Council, with Appendix, Proceedings, &c. 6d.
7. Second Report of the Council, with List of Contributions, &c. 3d.
8. Third Report of the Council, with Appendix—Address to the Imperial Academy of Sciences at St. Petersburg. 3d.
9. Fourth Report of the Council. 3d.
10. Report of the Fourth General Meeting, held at Bradford, with Speech of M. Michel Chevalier, &c. 6d.
11. Tables of Local Weights and Measures used in the United Kingdom. 6d.
12. The Decimal System of Measures, Weights, and Money. By William Arthur Jones, M.A. Third Edition. 6d.
13. *What is the Best Unit of Length. By James Yates, Esq., Vice-Pres. 1s.
14. Report on the Unit of Length.
15. Memorial on Decimal Weights, presented to the Chancellor of the Exchequer. 3d.
16. On a Uniform System of Weights, Measures, and Coins for all Nations. By Henry Hennessy, Esq., F.R S., M.R.I.A. 6d.
17. On the Metrical System of Weights and Measures, and the Desirableness of its Universal Adoption. By the Rev. John Scott Porter. 6d.
18. *Decimal Coinage, Ought it to be International? By T. C. Mossom Meekins, Esq., Barrister-at-Law. 6d.
19. Improvements in Arithmetic, with a Vindication of the Decimal Principle. By James Yates, Esq., and the Rev. Alfred Barrett, M.A.
20. On the Impediments to the Introduction of the Metrical System of Weights and Measures, and the Best Way to Remove them. By Frank Fellows, Esq., of the Wolverhampton Chamber of Commerce. Second Edition, Smith, Elder, and Co. 6d.
21. Fifth Report of the Council, with Prof. Levi's Report on German Weights and Measures. 6d.
22. Descriptive Catalogue of a Collection of Current Coins of all Countries in the International Exhibition. By James Yates, Esq., M.A. 6d.
23. The Metric System—Its Prospects in this Country. By the Rev. John Kerr, M.A., Mathematical Lecturer, Free Church Normal College, Glasgow. Effingham Wilson. 6d.

* *Tracts so marked are nearly exhausted and out of print.*

LONDON: W. TROUNCE, PRINTER, CURSITOR-STREET, CHANCERY-LANE.

21980

END OF
TITLE